



PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: **March 2003 Central Facilities Area Landfills I, II, and III
Annual Monitoring Report (2002) (Draft)**

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
COMMENTS				
GENERAL COMMENTS				
1			<p>The new ground water elevation data confirms the concerns regarding accuracy of DOE's previous interpretation of ground water gradients in the vicinity of the Central facilities Area (CFA) landfills. While this report presents the revised groundwater gradients, it does not provide a comprehensive evaluation and discussion of the impact of these new groundwater gradient data on critical issues such as the effect on the site conceptual model and the impact of the revised gradients on the adequacy of the current CFA groundwater monitoring system.</p> <p>The project focus on identification of the source of nitrate, in light of the new groundwater gradient data, should be expanded to include reevaluation of the effectiveness of the CFA landfill groundwater monitoring well system. Considering the proximity of many of the well locations the CFA landfills and the potential for lateral flow of recharge along interbed contacts, the current monitoring system may not intercept contaminant flow paths emanating from the CFA landfills. Landfill 1, for instance does not, in light of the revised groundwater gradients, have any downgradient monitoring locations. Also Landfill 2 no longer appears to have an upgradient monitoring location.</p>	<p>The adequacy of the CFA monitoring system will be discussed in the section 2.1. A recommendation will be made to add a new monitoring well south of Landfill I and in the southeast corner of Landfill II to cover areas of the landfills that are currently not being monitored based on the latest water-level map.</p> <p>The CFA landfill wells are not open hole wells. They are screened (20 feet) at the water table, except LF2- 10. Consequently contaminant concentrations are not being diluted and vertical profile sampling is not an option.</p>



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			In addition, a program of stratified groundwater sampling should be implemented in the CFA monitoring wells to determine whether contaminants are present in the aquifer in preferential flow paths. The current practice of open borehole groundwater sampling may be diluting contaminant concentrations by collecting the groundwater samples over the entire length of the open borehole. (J.R.)	
2			The soil gas data presented in this report indicates high concentrations of a number of chlorinated solvents and daughter compounds and states that the concentrations are for the most part within historically reported concentrations. There is no discussion of the potential significance of increasing contaminant concentrations reported, particularly at depth (77.5 and 107.5 feet) in the vadose zone and the apparent increasing trends in contaminant concentrations at almost all of the locations sampled. This report should propose to evaluate the potential impact of the increasing vadose zone contaminant concentrations on groundwater quality. (J.R.)	A recommendation will be added to install deep vapor ports at the two new monitoring locations to address issues of deep gas migration. The significance of increasing concentrations at 77.5 and 107.5 feet is difficult to assess without doing some modeling. Vadoze zone modeling was not within the scope of this annual report since this report was to report results. Qualitative comparisons will be made with the RWMC, i.e. concentrations in the soil gas at the CFA landfills are several orders of magnitude lower than at the RWMC where the concentrations of carbon tetrachloride in the groundwater are near the MCL.
3			The moisture infiltration data in this report is calculated to be within a range of less than 0.25 to 2.97 inches of recharge for 2002 NAT monitoring, and recharge is below detectable limits for 2002 TDR monitoring. However, one NAT is located near a shallow depression, and two other NATs are located near the	It will be recommended to perform infiltration modeling to address the performance of the landfill covers. The modeling would evaluate the effect of different types of vegetation on the performance of the covers.

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			<p>edge of a landfill where accumulation of snowdrifts are thought to contribute to moisture infiltration readings. There are two additional NATs: LF3-05 is located within Landfill III and LF2-04 is located off of Landfill II. Recharge calculated at LF3-05 has consistently been detected below 0.25 inches, which is less than measurements in the years prior to cover construction. Similarly, most of the NATs show less recharge after the landfill covers were constructed. Yet this decrease in recharge is also seen at LF2-04, which is located off of Landfill II and, presumably, is not incorporated under the landfill cover. With the limited data and some ambiguous results, it is difficult to draw a conclusion about the effectiveness of the landfill covers in reducing infiltration. It would be useful to considered conducting a simulated infiltration event as proposed during the OU 4-12 five year review to provide additional information about the effectiveness of the cover.</p> <p>In addition to questions about data reliability, there are also questions about how this data is translated into recharge estimates. The landfill covers were completed with one foot of low permeability soil, followed by approximately 6 inches of loose soil to make up the top vegetative layer. But recharge has not been calculated as the moisture moving below the low permeability layer. Instead, recharge is calculated as moisture below an evapotranspiration depth of 3 to 4 feet for the NATs and 4 feet for the TDRs. The landfill covers were designed as infiltration barriers with an evapotranspiration component. If the vegetation is expected to have root penetration through the low</p>	<p>In the July 16, 2003 teleconference, it was agreed that a simulated infiltration event would not be beneficial.</p>

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			permeability layer, it would seem that the landfill covers are acting primarily through evapotranspiration rather than as infiltration barriers. If this is the case, the cover design should be assessed to determine if the soil depth, vegetation type, and other parameters are adequate for effective evapotranspiration. (K.I.)	

SPECIFIC COMMENTS

1	Abstract, Last Paragraph	Page iii	The text states that “the primary soil gas contaminants, chlorinated solvents, their degradation products, and freons, do not appear to be affecting groundwater since they were not detected in groundwater.” The revised groundwater gradients presented in this report indicate that the groundwater monitoring system at the CFA may not provide sufficient coverage to insure that the groundwater samples being collected are representative of the groundwater quality downgradient of the CFA landfills. The lack of contaminant detection by the current groundwater monitoring system no longer supports the conclusion that there is no impact to groundwater quality. (J.R.)	A qualifying statement will be added after the sentence that states that groundwater does not appear to be affected by soil gas contaminants. The following will be added “However, the revised groundwater gradients presented in this report indicate that the groundwater monitoring system at the CFA may not provide sufficient coverage to insure that the groundwater samples being collected are representative of the groundwater quality downgradient of the CFA landfills I and possibly II.
2	Section 1.2, First Paragraph	Page 3	The statement that “In some places a clay-rich layer 0 to 9-feet thick exists above the bedrock.” should be specific as to whether this layer is present in the vicinity of the CFA and provide a reference. In addition, if the sedimentary layer being discussed refers to the “Older Alluvium” this sedimentary layer is absent, in some areas as near as INTEC, and has been described in	The “Ansley, S. L., L. C. Hull, and S. M. Burns, 1988, <i>Shallow Drilling Report for CFA Landfills II and III – FY-1988, Characterization of Surficial Sediments</i>, EGG-ER 8291, Rev. 1.” Will be referenced

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			geotechnical borings as a silt as opposed to a clay. See Sage Environmental's report on the ICDF Geotechnical Investigation, 02. (J.R.)	
3	Section 1.2.4, Second Paragraph	Page 4	The determination concerning the current protectiveness of the remedy was deferred in the OU 4-12 five-year review report until the agencies could evaluate the additional information included in this monitoring report. (K.I.)	The protectiveness statement has been deleted.
4	Section 2.2, Second Paragraph	Page 6	The text states that "Groundwater samples were collected from 11 wells in the vicinity of the CFA landfills (see Figure2)." The text goes on to list wells LF2-08 and LF2-10, which do not appear in Figure 2. Please include the locations of all wells that are being monitored in Figure 2. (J.R.)	The reference to LF2- 10 will be deleted and the text will be changed to LF2-11. LF2-10 was not sampled. LF2-08 will be added to Figure 2.
5	Figure 2	Page 7	There are sections of this report that refer to the CFA production wells, but these wells are not shown in this or other figures in the report. This information should be added. (K.I.)	The CFA production wells will be added to Figure 2.
6	Section 3, Second Paragraph	Page 19	The presentation of the soil gas contaminant monitoring does not include a discussion of the increasing contaminant concentrations trends apparent in the data. Many of the historic high concentrations appear to be isolated peaks or pulses that occurred in 1997-8 and may be the result of significant infiltration or some other event. The contaminant concentrations in the vadose zone are somewhat erratic recording alternating	Deep vapor ports will be added to the two new monitoring wells to assess deep migration of soil gases. A qualitative comparison will be made with the RWMC, i.e. concentrations in the soil gas at the CFA landfills are several orders of magnitude lower than at the RWMC. At the RWMC, carbon tetrachloride is at or barely above its MCL.

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			<p>increases and decreases, but generally indicate an upward trend. The text states that the contaminant concentrations do not exceed historic high concentrations but should include discussion of the overall increase in contaminant concentrations and the potential to impact groundwater quality.</p> <p>In addition, the deeper monitoring zones, 77.5 and 107.5 bgs, which are constructed above and below the 110 Interbed respectively, also indicate increasing contaminant concentrations. (See Figures 8a, 8b, 8c, and 8d, for example). This suggests that contaminant concentrations may be increasing sufficiently to result in contaminant diffusion through the interbed material. The text should include discussion of the increasing contaminant concentrations at increasing depths within the vadose zone suggesting movement of chlorinated solvents below the 110 Interbed towards the Snake River Plain Aquifer. (J.R.)</p>	<p>As noted in the comment, concentrations are somewhat erratic. The potential to affect groundwater would have to be evaluated through modeling after the deep vapor ports are sampled.</p>
7	Section 5.2	Page 35	<p>This section does not include information about the CFA-04 Pond waste in terms of the nitrate chemical type, form, or disposal history that might help explain how the CFA-04 Pond waste is thought to contribute to nitrate levels currently measured in the CFA-MON wells. For instance, if the CFA-04 Pond received laboratory waste between 1953 and 1969, why would we still be seeing high levels of nitrates in the CFA-MON wells today? (K.I.)</p>	<p>A description of the CFA-04 waste stream will be added to section 5.2.</p> <p>The travel time to aquifer for CFA-04 was estimated to be 39 years using GWSCREEN in EDF-ER-059. The reason nitrates would still be high is because of the time lag between disposal to the pond and migration to the aquifer. This explanation will be added to the report.</p>

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8	Section 7	Page 45	<p>The recommendations section should include a proposal to conduct a n analysis of contaminant movement based on the revised groundwater gradients at CFA and assumed groundwater velocities in order to evaluate the potential for the current monitoring well locations to detect contaminant flow away from the CFA landfills.</p> <p>In addition, vertical profile sampling should be conducted initially in the CFA-Mon wells and ultimately, for all CFA monitoring wells to determine whether there are preferential flow paths present. Groundwater analysis of samples from CFA Mon-002, for example, indicate the presence of organic contaminants at low concentrations. Low flow or vertical profile sampling could identify whether preferential flow paths with higher contaminant concentrations are present within the aquifer. (J.R.)</p>	<p>A recommendation will be added to include a new well south of landfill I and southeast of Landfill II.</p> <p>The vertical profile sampling is not possible for the CFA-MON-A-002. This well is screened across the water table.</p> <p>A recommendation will be added to model how much infiltration would have to occur to observe a detectable quantity of contamination in the groundwater.</p>
9	Figure B-9	Page B-44 through B-47	<p>These figures should be labeled as LF3-east rather than LF2-east. (K.I.)</p>	<p>Change will be made.</p>